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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/593,548

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Michael B. Simpson

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EXAMINER

HAMMOND, CHARLES

ART UNIT

PAPER NUMBER

1773

NOTIFICATION DATE

DELIVERY MODE

10/29/2010

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b> 10/593,548	<b>Applicant(s)</b> SIMPSON ET AL.	
	<b>Examiner</b> CHARLES HAMMOND	<b>Art Unit</b> 1773	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 19 September 2006.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 September 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948)    | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>07/27/2007; 07/27/2007</u> .                                  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Priority***

1. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

### ***Claims***

2. The claims filed on September 19<sup>th</sup> 2006 appear to reflect the claim amendments to PCT/US04/41053 filed on April 12<sup>th</sup> 2006.

### ***Specification***

3. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: the specification does not include support for claim 7. The specification does not include support for an alarm that is signaled when a current ratio is higher than a previous ratio.

### ***Claim Objections***

4. Claims 5-6 are objected to because of the following informalities: the claims are dependent upon claims 8 and 9, respectively. However, claims 5-6 can not depend on a claim that antecedes them. For purposes of examination, it will be assumed that claims 5-6 depend on claim 1. Appropriate correction is required.
5. Claims 12 and 15 are directed towards a "computer readable medium". In order to avoid issues with claiming non-statutory subject matter pursuant with 35 U.S.C. 101 applicant should amend claims 12 and 15 to recited computer readable medium that is "non-transitory" (see Office Gazette Notice 1351 OG 212).

***Claim Rejections - 35 USC § 112***

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 7 and 14-15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

8. Claim 7 recites the limitation "the previously measured ratio" in lines 2-3. There is insufficient antecedent basis for this limitation in the claim.

9. Claim 14 is directed towards a method of formulating a batch. However, as the claim currently reads, it appears applicant is trying to claim a computer algorithm. Claim 14 should be amended to positively recite a "chemical control device" that is "programmed" or "configured" to perform the recited method steps.

10. Claim 14 recites the limitation "first fractional dill delta values" and "second fractional fill delta values" in steps G-H and J. There is insufficient antecedent basis for this limitation in the claim.

11. Claim 15 recites the limitation "first fractional dill delta values" and "second fractional fill delta values" in steps G-H and J. There is insufficient antecedent basis for this limitation in the claim.

***Claim Rejections - 35 USC § 102***

12. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

Art Unit: 1773

13. Claims 1-4, 11, 12, and 13 is rejected under 35 U.S.C. 102(b) as being anticipated by Hoffman et al. (U.S. Patent No. 6,050,283) (already of record), hereinafter referred to as "Hoffman".

14. In regards to claim 1, Hoffman teaches a method of formulating a batch comprising at least three ingredients (C1-C3 and DI water), comprising:

determining a number of fractional filling sequences for producing a desired total volume of the batch, wherein the number of fractional filling sequences is at least two (once the number of chemical to be added is input the controller would calculate the number of steps depending on the number of chemicals, in Hoffman apparatus a tri-chemical mixture requires at least 2 steps);

wherein a first fractional filling sequence comprises:

determining a first target quantity for each of the ingredients ("one selects chemicals to be blended");

admitting each of the ingredients (ingredients 1 and 2 are equivalent to "a known dilution" of a first chemical (i.e. first chemical and water) and ingredient 3 is equivalent to second chemical) to a given size container (tank 2) to fill the container to a first fractional fill percentage (first chemical and second chemical to be blended are added to the tank 2, the fill percentage not overfilling the tank);

determining the quantities of each ingredient in the container (SCM measures the concentration of C1 and C2);

Art Unit: 1773

calculating the ratio of the first target quantity to the determined current quantity for at least one of the ingredients (the measurement of the SMC relates to the volume ratio of C1 and C2);

wherein each subsequent fractional filling sequence comprises:

determining the next target quantity of each ingredient needed for the current fractional fill sequence (the SCM signal is compared to a target mixture set point);

calculating the corrected quantity of the at least one ingredient by multiplying the next target quantity of the ingredient by said ratio (a signal is produced in order to create the desired ratio of the chemicals). Note: multiplying a ratio by a quantity is a common mathematical way to create an adjusted (target) quantity);

admitting the corrected quantity of the ingredient (C1-C2 or water) to the admixture in the container (the signal produced directs additional chemicals or water to be added to the mixture) (Note: if C1 is the ingredient being corrected C1 may be added, or C2 or water may be added);

admitting the quantity of the other ingredients (C1-C2 or water) to adjust the proportion of ingredients to the target formulation for the current fractional fill sequence (signal is produced that directs additional chemicals or water to be added to the mixture) (Note: if C1 is the ingredient being corrected C1 may be added, or C2 or water may be added);

wherein the total volume of the batch includes: the total volume of the first reagent ingredient (water), the total volume of the second ingredient (first chemical), and the total volume of the third ingredient (second chemical) (see column 5 lines 24 through column 6 line 24, column 6 line 59 through column 7 line 26).

15. In regards to claim 2, Hoffman teaches a method wherein the first target quantity of each ingredient is determined from the equation:

$$\text{chemFracVol} = \text{chemTotalVol} * \text{pourUp1Frac}$$
 (the target quantity of each ingredient would be calculated by multiplying the chemical volume (chemTotalVol) times the percentage of the chemical being poured into the tank (pourUp1Frac).

16. In regards to claim 3, Hoffman teaches a method wherein determining the quantity of each ingredient in the container comprises determining the percent by weight of each ingredient (see column 7 lines 14-16).

17. In regards to claim 4, Hoffman teaches a method further comprising determining the target volumetric blending ratio of the ingredients to be admitted to the container (Hoffman teaches that HF at 49%, HNO<sub>3</sub> and HA<sub>c</sub> are blended at specified volume ratios (see column 7 lines 20-26).

18. In regards to claim 11, Hoffman teaches a method wherein one ingredient is H<sub>2</sub>O (a first chemical at a known dilution (water is used to dilute chemicals such as HF) (see column 2 line 59 through column 7 line 26).

19. In regards to claim 12, Hoffman teaches the above method is executed by a controller or computer. Therefore, there must be a computer read-able medium in

Art Unit: 1773

communication with the computer for executing the method (see column 3 line 62 through column 34 and rejection of claim 1 above).

20. In regards to claim 13, Hoffman teaches an apparatus (system) for formulating a batch comprising at least three ingredients (C1-C3 and water), comprising:

a tank (blender tank 2);

at least two chemical dispensing devices (conduits 8, 10 and 12), each chemical dispensing device having an input and an output (chemical flow into conduits through valves 23, 29, and 31 and flow out into blender tank), each input coupled to a chemical supply (chemicals C1-C3 would come from a source coupled to the conduits) and each output coupled to the tank (2);

an analytical instrument (SCM 28) for measuring the quantities of one or more ingredients, the analytical instrument coupled to the tank (2) (SCM 28 is couple to tank 2 through conduit 26);

a controller (automatic control system) coupled to the chemical dispensing devices (conduits 8, 10, and 12) and the analytical instrument (system) for performing the method (see rejection of claim 1 above) (see column 3 line 58 through column 4 line 34, column 5 lines 24 through column 6 line 24, and Fig. 1A).

**Note:** the remainder of the claim appears to recite functional limitations that the controller performs. The apparatus in Hoffman apparatus contains all of the structural limitations of claim 13, and therefore, anticipates the claim. Functional limitations are not given weight in an apparatus claim; apparatus claims must distinguish over the prior art in terms of structure rather than function (see MPEP 2114).



Art Unit: 1773

***Claim Rejections - 35 USC § 103***

21. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

22. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

23. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

24. Claims 5-6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoffman et al. (U.S. Patent No. 6,050,283) (already of record), hereinafter referred to as "Hoffman".

Art Unit: 1773

25. In regards to claim 5, Hoffman teaches the method as described in claim 1 above. Hoffman does not specifically teach that each ingredient has a known supply concentration in the method described. However, Hoffman teaches testing the apparatus using known concentrations (see column 7 lines 27-66). Furthermore, standard chemical mixing operations take into account the concentration of the ingredient in order to produce a desired mixture.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include ingredients with known concentrations in the Hoffman apparatus for the benefit of producing a desired mixture.

26. In regards to claim 6, Hoffman teaches the apparatus as described in claim 1. Hoffman does not specifically teach calculating the target quantity of one ingredient based on the target volumetric blending ratio and the supply concentration of the ingredient. However, Hoffman teaches testing the apparatus using known concentrations (see column 7 lines 27-66). Furthermore, it is common practice to take the supply concentration of a chemical into account when determining a target volumetric blending ratio for the benefit of producing a desired mixture.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to calculate the target quantity of one ingredient based on the target volumetric blending ratio and the supply concentration of the ingredient in the Hoffman apparatus for the benefit of producing a desired mixture.

Art Unit: 1773

27. Claim 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hoffman et al. (U.S. Patent No. 6,050,283) (already of record), hereinafter referred to as "Hoffman", in view of Wilmer et al. (U.S. Patent No. 7,344,298), hereinafter referred to as "Wilmer"

28. In regards to claim 7, Hoffman teaches the method as described in claim 1 above. Hoffman does not specifically teach comparing the current ratio of the target quantity to the determined quantity for at least one of the ingredients to the previously measured ratio, wherein if the current ratio is larger than the previous ratio an alarm signal is asserted.

In the analogous art of mixing chemicals in semiconductor processes, Wilmer teaches that if a blend sequence creates a higher concentration than required an alarm (failsafe subroutine) is activated for the benefit of producing accurate blends at a fast rate with little waste of materials (see column 9 lines 7-30 and column 11 lines 4-67).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include an alarm that is triggered when a target quantity exceeds a reference quantity, including comparing the current ratio of the target quantity to the determined quantity for at least one of the ingredients to the previously measured ratio in the Hoffman apparatus in view of Wilmer for the benefit of producing accurate blends at a fast rate with little waste of materials.

29. In regards to claim 8, Hoffman teaches the method as described in claim 1 above. Hoffman does not teach the use of adsorption spectroscopy for measuring the quantity of each ingredient.

Art Unit: 1773

In the analogous art of mixing chemicals in semiconductor processes, Wilmer teaches that adsorption spectroscopy is a suitable method for determining the concentration of a single species within a mixture (see column 7 lines 28-43).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include absorption spectroscopy for measuring the quantity of each ingredient in the Hoffman apparatus in view of Wilmer for the benefit of determining the concentration of a single species within a mixture.

30. In regards to claims 9-10, Hoffman teaches the method as described in claim 1. Hoffman does not specifically teach a method wherein one of the ingredient is  $\text{NH}_4\text{OH}$  and on ingredient is  $\text{H}_2\text{O}_2$ .

In the a analogous art of mixing chemicals in semiconductor processes, Wilmer teaches that mixtures of  $\text{NH}_4\text{OH}$  and  $\text{H}_2\text{O}_2$  are commonly used for the benefit of creating suitable mixtures for treating semi-conductor substrates in semi-conductor manufacturing (see column 5 lines 1-12 and column 12 lines 35-60)

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to include of  $\text{NH}_4\text{OH}$  and  $\text{H}_2\text{O}_2$  as ingredients in the Hoffman apparatus for the benefit of creating suitable mixtures for treating semi-conductor substrates in semi-conductor manufacturing.

***Allowable Subject Matter***

31. Claim 14 is allowable if applicant fixes a 35 U.S.C. 112 second paragraph issue. Claim 15 is allowable if applicant amends the claim to include "non-transitory" computer readable medium and fixes a 35 U.S.C. 112 second paragraph issue.

Art Unit: 1773

32. The following is a statement of reasons for the indication of allowable subject matter:

The prior art teaches fractional filling methods that comprise filling a container at least partially, measuring the concentration of at least one ingredients within the container, and admitting additional ingredients in order to achieve a desired target ratio of at least one ingredient within the container. However, the prior art does not teach or fairly suggest a method or computer readable medium for performing fractional fill sequences comprising the steps in claims 15-16. More specifically the prior art does not teach or fairly suggest storing fractional fill delta values, comparing a first and second fractional fill delta values, determining if any of the second fractional fill delta values are greater than or equal to the first fractional delta vales, and communicating an error message if the second fractional fill delta values are greater than or equal the first fractional fill delta values; and furthermore, deciding which fractional fill sequence has been completed and transitioning to the next appropriate step (see claims 14-15).

### ***Conclusion***

33. Claims 1-15 are rejected.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CHARLES HAMMOND whose telephone number is (571)270-3595. The examiner can normally be reached on 8am-5pm M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill Warden can be reached on (571)272-1267. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1773

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/CHARLES HAMMOND/  
Examiner, Art Unit 1773

/Jill Warden/  
Supervisory Patent Examiner, Art Unit 1773